1989

Jester software and user manual

Aron Nelson
San Jose State University

Order Number 1339637

Jester software and user manual. [Original computer program]

Nelson, Aron Clement, M.A.

San Jose State University, 1989

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

JESTER SOFTWARE AND USER MANUAL

A Thesis

Presented to

The Faculty of the Department of Music

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

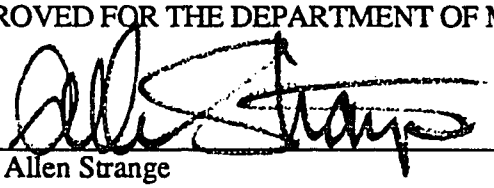
Master of Art

by

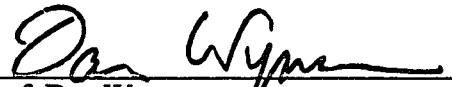
Aron Nelson

December, 1989

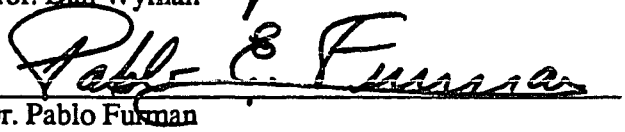
APPROVED FOR THE DEPARTMENT OF MUSIC



Prof. Allen Strange

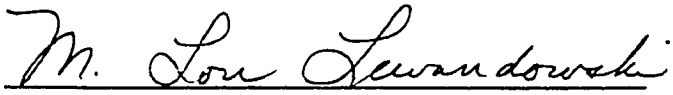


Prof. Dan Wyman



Dr. Pablo Fuksman

APPROVED FOR THE UNIVERSITY



Jester

Version 1.0

User's Manual and Software

by

Aron Nelson

Disclaimer

The author hereby disclaims all warranties relating to this software, whether expressed or implied, including without limitation any implied warranties of merchantability or fitness for a particular purpose. The author will not be liable for any special, incidental, consequential, indirect or similar damages due to loss of data or any other reason, even if the author or an agent of the author has been advised of the possibility of such damages. In no event shall the author be liable for any damages, regardless of the form of the claim. The person using the software bears all risk as to the quality and performance of the software. The author retains all rights to the software for commercial exploitation.

Copyright

ABSTRACT

JESTER SOFTWARE AND USER MANUAL

Aron Nelson

The generation of System Exclusive messages is largely ignored by most extant sequencers. Because sequencers are mainly record and playback devices, they are not designed to facilitate the generation of System Exclusive messages. System Exclusive messages are of importance to the composer because they allow the composer to access and alter almost every parameter of a MIDI device. Current methods of manipulating MIDI devices using MIDI note messages and controller messages only provide limited access to the internal processes of the MIDI device. The System Exclusive specification of a MIDI device defines the complete interface to the internal processes contained in the MIDI device.

Jester is a Macintosh program that interprets mouse input as a visual gesture and generates fixed or dynamic systems exclusive messages in real-time as MIDI events or as a Standard Type 0 MIDI File. Once output is defined as a MIDI File or as MIDI events, other programs can manipulate the System Exclusive messages.

Table of Contents

1 Introduction

First generation sequencers, while designed to handle the recording and playing back of most MIDI data, have largely ignored one important part of the MIDI specification, System Exclusive. Sequencers, as a general rule, have been mainly recording devices that store a performance as MIDI events and later "play back" the events with some semblence to their original input. While adequate for manipulating recorded MIDI events, sequencers have not been as flexible for creating MIDI events. We now see second generation sequencers implementing MIDI controls in one way or another. Programmable sliders, graphic editing windows and list event editors have all become the standard on state of the art sequencers. Yet none of the currently available sequencers have been able to generate System Exclusive messages as easily as they can other MIDI messages.

System Exclusive events have probably been largely ignored because of the lack of available documentation and the very loosely defined specification. It is often very difficult to obtain the System Exclusive specification for a particular MIDI device. This seems to be changing as manufacturers are now including the System Exclusive specification as part of the device manual. System Exclusive events are also very different from other MIDI event messages in that they are not assigned to any specific MIDI channel. System Exclusive messages are also different in content for every manufacturer and in many circumstances for many different instruments in the manufacturers line. Most MIDI event messages are also of a fixed length but System Exclusive messages are again different in that they may be of any length.

System Exclusive events are important because they can provide **dynamic parameter control**. Many of the newer MIDI devices can accept System Exclusive codes to activate internal parameters in real-time. A program that could generate enough varying System Exclusive events over time could simulate a smoothly changing parameter over time. For example, the resonance of a filter could be increased or decreased over time; the LFO speed of a carrier could be changed over time; a modulator's frequency could be changed over time. System Exclusive messages can change parameters that could not be accessed through standard MIDI controllers. System Exclusive messages allow a composer to control nearly every parameter on a MIDI device remotely.

State of the art sequencers can now record and manipulate System Exclusive events but still cannot provide a generalized means of creating System Exclusive messages. The graphic editing window, while widely implemented for MIDI controllers, is an ideal method for creating graphic gestures which can be applied to System Exclusive messages. A graphic editing window allows the user to input of large amounts of data in a very general and visual manner. A gesture is created by dragging a mouse in a window creating a graphic representation of vertical and horizontal movement. Therefore a gesture in this document is defined as a graphic display of movement created by a mouse pointer in Jester's Draw window.

Jester interprets input from a mouse creating a graphic gesture which can be converted in real-time to MIDI data or saved as a Standard Format 0 MIDI File for conversion into other MIDI control programs. Input gestures are converted to MIDI data as System Exclusive messages. Various functions can modify the input gesture such as retrograde, scaling and inversion. Standard Apple Macintosh conventions also allow cut, copy and pasting of the graphic gesture. If the gesture is output as a Standard MIDI File, other MIDI programs such as a sequencer can also perform other editing and modifications to the gesture.

1.1 Hardware Requirements

Jester requires a Macintosh Plus computer or later with 1 megabyte of internal memory in order to run. If you wish to utilize the MIDI input/output functions of Jester, you must also place the **Apple MIDI Manager™** and **Apple MIDI Driver** in your System Folder.

1.2 Files in the Distribution Disk

The complete Jester package consists of the following files:

Jester 1.0 application.
Jester Manual, Jester manual in Microsoft Word format.

1.3 Installing Jester

If you plan to use Jester from a floppy disk, all you have to do is start up the Macintosh with a system tools disk version 6.0.2 or later.

If you plan to use Jester on a hard disk, simply copy all of the files on the Jester distribution disk to a folder on your hard drive.

1.4 Installing the MIDI Manager™

To use the **MIDI Manager™**, you must place the **MIDI Manager™** INIT and the **Apple MIDI Driver** INIT into your System folder. If you are not using MultiFinder, then you must also install the **Patchbay** D/A into your D/A menu by using Font D/A mover which is in your Apple System Utilities disk. After the files have been installed, restart your Macintosh.


Apple MIDI Driver


MIDI Manager™

1.5 Macintosh Basics

This manual assumes that you are familiar with the basics of using a Macintosh. If you are not, take the "Guided Tour" that comes with it, or do the tutorial in the Macintosh manual.

2 Quick Jester Tour

2.1 Starting Jester

This tutorial will demonstrate how to create a System Exclusive gesture that can be mapped to any parameter of your MIDI device.

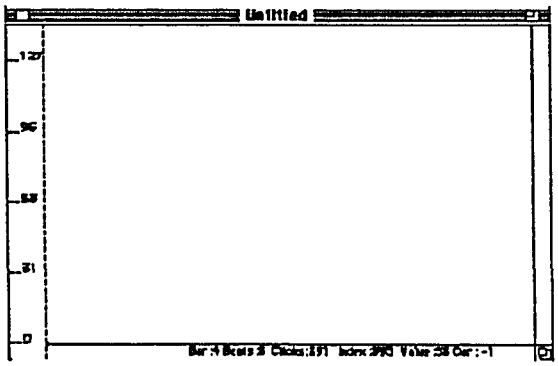
Double-click on the Jester icon to start the program. When Jester has been loaded into memory, you should see four menus: **File, Edit, Do** and **MIDI.**

Double-Click the Jester Icon to start the program

2.2 Opening a New Document

Choose **New** from the **File** menu.

You should see Jester's main Draw window appear. At this point, note the ruler on the left side of the Draw window, indicating the approximate range of the gesture.



Ruler showing approximate values from 0-127

2.3 The Pen Mode

Move the mouse cursor over the window. Note how it changes from a standard arrow cursor to a pen depending on where you position the cursor.

In Jester, time can be expressed as Bars, Beats, Clicks, or Hours, Minutes, Seconds and Frames as in SMPTE. Notice the time display and value indicators at the bottom of the Draw window. This display tells you where the cursor is positioned in terms of time. You may **toggle** this display anytime by choosing **SMPTE** or **Beats** from the **Do** menu.

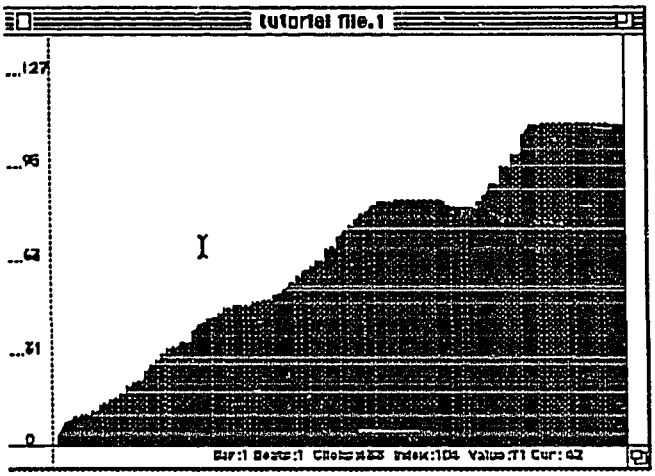
Bar:3 Beats:4 Clicks:464 Index:277 Value:54 Cur: -1

Bars, beats and clicks

Hrs:0 Mins:1 Secs:7 Frames:23 Value:44

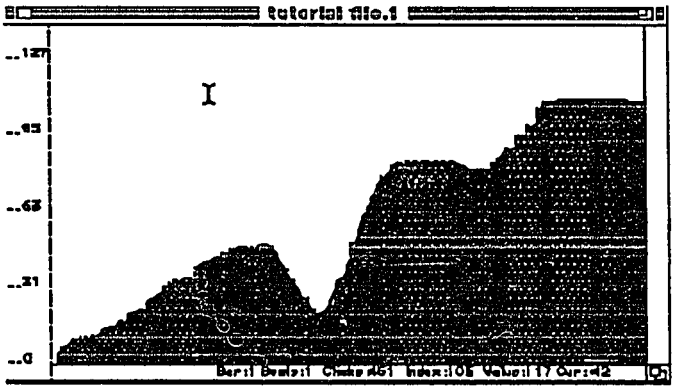
Hours, minutes, seconds and frames

Move the cursor from left the right over the Draw window and note that the time display is only active when the cursor is in draw mode. As you drag the mouse from left to right look at the time display. It increments as you move the mouse in a left to right motion. When the cursor is in the shape of a pen, you may depress the mouse button at any time and drag over an area of the window inserting System Exclusive events. Draw a gesture similar to the following:



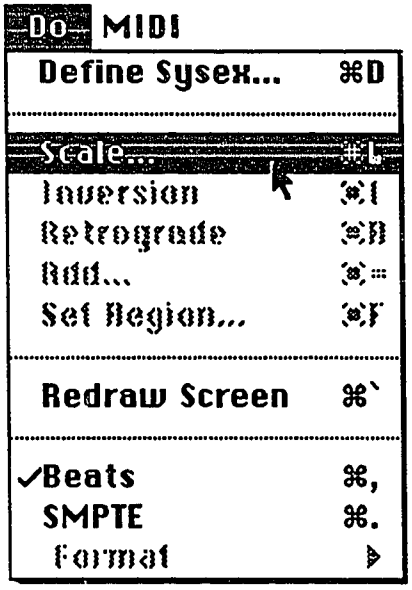
2.4 Editing Your Gesture

You can now edit the gesture that you created. Drag the mouse over any part of the window to redefine the area and overwrite new values. Modify your gesture so that it looks like the following:

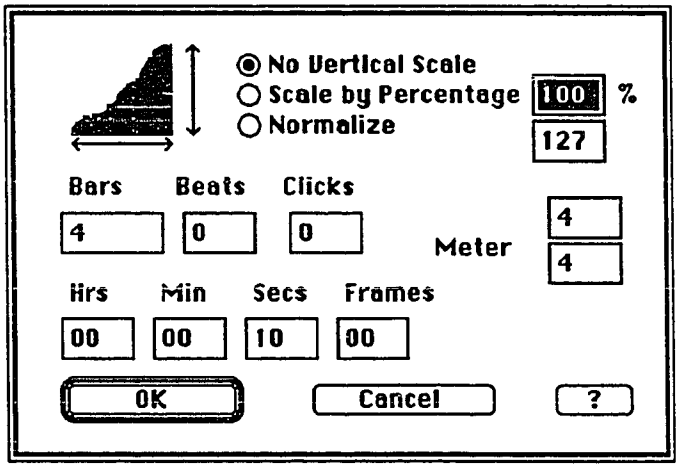


2.5 Scaling Your Gesture by Percentage and Time

Jester allows you to scale your gesture by a percentage and time. To scale your gesture select the **Scale** command in the **Do** menu.



The following dialog box will appear:



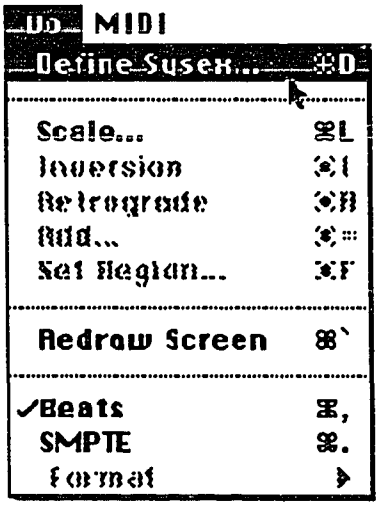
The top two choices, **Scale by Percentage** and **Normalize**, allow you to vertically scale your gesture. **Scale by Percentage** will scale your entire gesture by the specified percentage. **Normalize** will "fit" your gesture so that the maximum height of the gesture never exceeds the normalize value. If the gesture height is currently less than the specified value, then the gesture will be scaled so that the current height will equal the entered value. Beats and clicks allow you to define a maximum duration for the gesture. A beat is defined as the denominator in the meter field. A bar is defined as the total number of beats in the the numerator section of the meter fields. Note that you may also define the duration in terms of SMPTE time as hours, minutes and seconds. Experiment and enter different values to scale your gesture. The **Help** button on the bottom right of the dialog will display a simple help message when pressed. This **Help** button can be found on all Jester dialogs. Use this button if you are uncertain about how you should proceed.

2.6 Redrawing the Screen

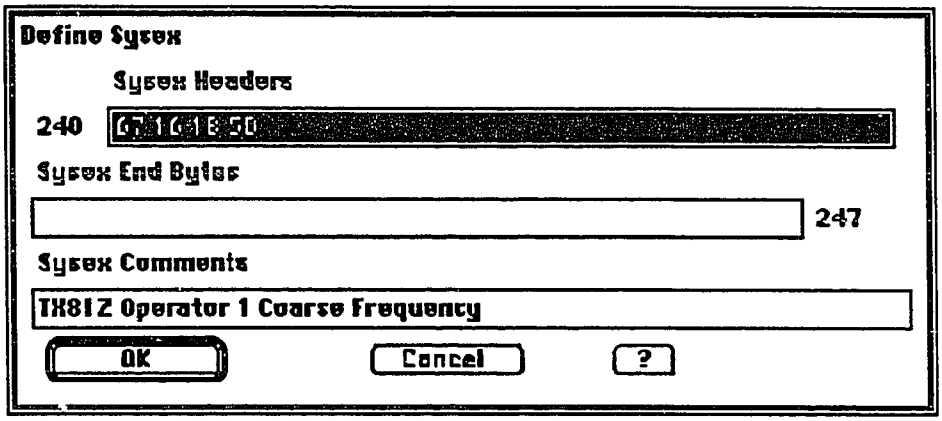
There will be times when Jester will not update the draw window properly. This will usually happen when Jester is in MultiFinder and has many windows covering the Draw window. To ensure that you are looking at a current image of your gesture, choose the **Redraw** command from the **Do** menu periodically to maintain proper imaging.

2.7 Mapping Your Gesture onto a System Exclusive Parameter

Choose the **Define Sysex** command from the **Do** menu.



The following dialog will appear:



This dialog allows you to apply your gesture to a System Exclusive MIDI parameter. All System Exclusive events start with System Exclusive status byte (decimal) 240 and end with end of System Exclusive (decimal) 247. These values are invisibly supplied by this program.

Most System Exclusive message take the form of **240** (hex $FO), **<manufacturers ID>** <device ID optional> <Address Bytes optional> **<data bytes>** and **247** (hex $F7). Jester will define the start of System Exclusive byte (decimal 240, hex F0) and end of System Exclusive (decimal 247, F7) for you, but you must type in the rest of the message. Note that the values of your gesture are inserted between the Sysex header and Sysex end bytes. Therefore a System Exclusive header of 67 16 18 50 will create 240 67 16 18 50 <your value> 247. In this case 240 is the start of System Exclusive, 67 is Yamaha's manufacturer ID number, 16 is the device ID which allows TX81Z's to "listen to" or "ignore" messages which contain a certain device ID number, 18 is a group number which addresses a part of the TX81Z memory along with 50 for parameter 50 which is the value for defining the coarse frequency of operator 1. After your Sysex header bytes, Jester will insert your current gesture value as a data byte and append a 247 which defines the end of System Exclusive.

This allows you to map gestures onto System Exclusive events very easily.

Yamaha System Exclusive Parameter Change Format:

STATUS	ID NO.	SUB STATUS	GROUP NO.	PARAMETER NO.	DATA	EOX
240	43	16+Channel	18	See Chart Below	<gesture values>	247

TX81Z partial parameter list.

Operator 1

Parameter*	Data Range	Parameter
48	0-7	Key Velocity Sensitivity
49	0-99	Operator Total Level
50	0-63	Operator Coarse Frequency
51	0-63	Operator Fixed Frequency
52	0-6	Detune

In this tutorial you will create a System Exclusive gesture that will modify the coarse frequency for Operator 1 in a TX81Z. Type in the numbers shown in the **Define Sysex** dialog. Substitute the above parameter numbers for the parameter which is currently 50 (coarse freq). Substitute parameter 51 to modify the fixed frequency. If you do not have a TX81Z handy, you will have to substitute your own MIDI device and System Exclusive messages. Contact the **International MIDI Association** and your MIDI instrument manufacturer to get a System Exclusive parameter list for your MIDI device.

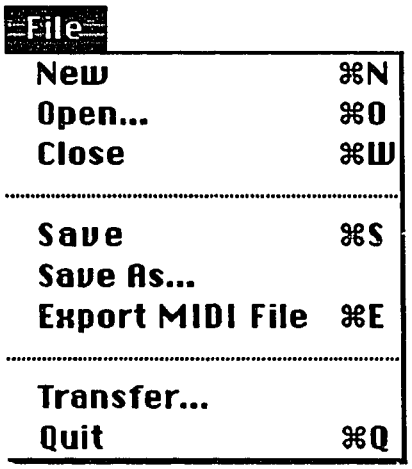
2.8 Saving Your Gesture

Saving your gesture is simple. Choose **Save** or **Save As** from the **File** menu. This will bring up the standard save dialog box found on all Macintosh programs. Type in a suitable name and press return. You have now created and stored your first gesture. Later you will learn how to audition your changes, play back your gesture and export it as a Standard MIDI Type 0 File.

3 The Menus

Jester has four main menus that you can use to modify your gesture; **File, Edit, Do** and **MIDI.**

3.1 The File Menu



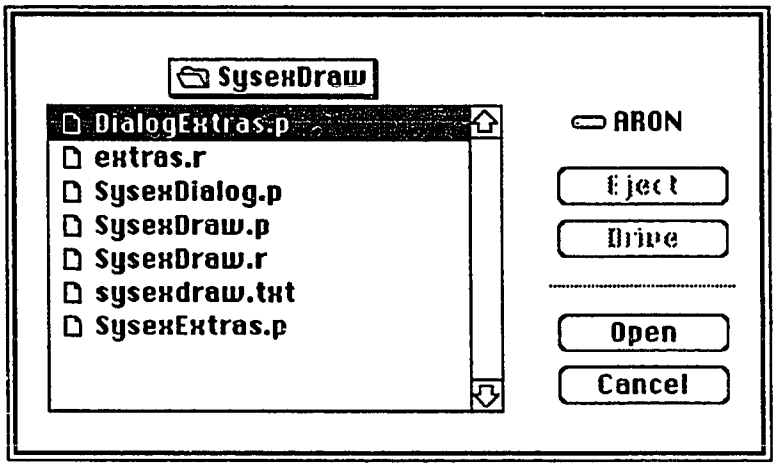
The **File** menu allows you to start a new document, open an existing one, **Save, Save As, Export MIDI file, Close, Transfer** and **Quit** from the application. Notice that some commands have command key equivalents. Using these command key equivalents can make working with Jester faster.

New

The **New** command deletes the current document and creates a new document. Use the **New** command when you would like to start a new document. The **New** command will ultimately prompt you for a save if you have an unsaved gesture currently in the Draw window. You must choose the **New** command before you can start a new gesture.

Open

The **Open** command allows you to resume work on a document that has been previously created and saved to disk. When you choose **Open**, you will get the standard Macintosh dialog that lists all of the Jester documents in the currently chosen folder on the selected disk.



You can use the scroll bars to see names of Jester documents which may not be in view. Click on the name of the document that you want and click on the **Open** button or double-click on the document name. Jester will then open the document and display the last state that the document was in when it was last saved. You may also open Jester files by double-clicking on the icon in the Finder while Jester is not running. The **Open** command only works with Jester files. It does not support the opening of MIDI Files, therefore you should always save your gesture as a Jester type file by using the **Save** or **Save As** commands and use **Export MIDI File** only if you plan to have another program utilize your gesture.

Close

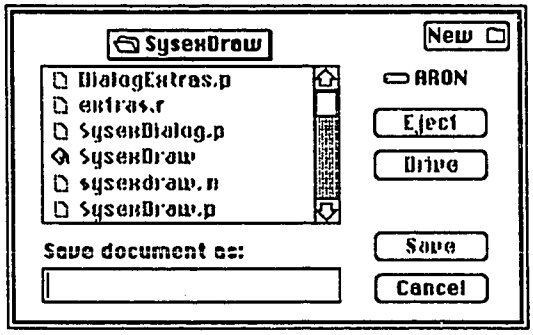
The **Close** command allows you to close the current document. If you have made changes since you opened or created the document, Jester will ask you whether you would like to save the changes.

Save

The **Save** command allows you to save recent changes that you have made to your gesture. This command saves the document with the same name shown in the Draw window title bar. If the name in the Draw window title bar is Untitled, Jester will prompt you for a new file name.

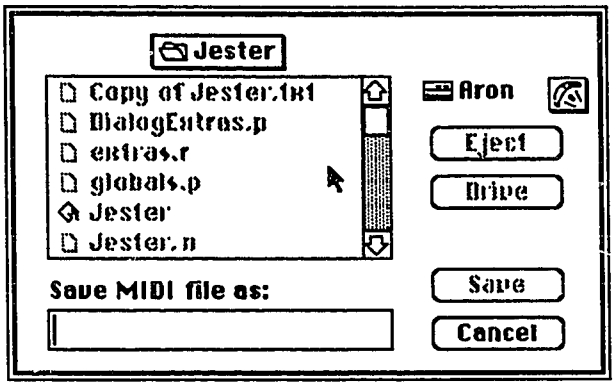
Save As

Save As allows you to save the current document with a new name or on a different disk. Both **Save** and **Save As** use the same standard Macintosh dialog when prompted for a filename.



Export MIDI File

The **Export MIDI File** command allows you to save the current document as a Standard Type 0 MIDI File. Once saved in this format, any program which can read a MIDI file and handle System Exclusive messages will be able to use your gesture.



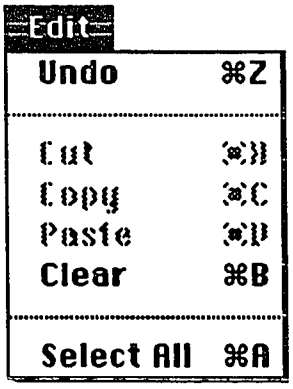
Transfer

The **Transfer** command allows Jester to "invoke" another application such as a sequencer. Use this command after creating a MIDI file to transfer to a sequencer. Use this command when **not** in MultiFinder.

Quit

This command quits the application while optionally saving any changes.

3.2 The Edit Menu



The **Edit** menu provides the standard Macintosh **Cut, Copy, Paste** and **Clear** functions. Segments of System Exclusive events may be freely cut and pasted anywhere in the current document.

Undo

The **Undo** command usually becomes active whenever a change is made to the gesture. Choosing this command will undo the last change made to the gesture.

Cut

The **Cut** command will erase or "zero out" the currently selected area. You must first define an area to cut with the I-Beam tool. When an area is cut, it is automatically placed into the Clipboard. It can be undone by using the **Undo** command or pasted anywhere by using the **Paste** command.

Copy

The **Copy** command will copy any region highlighted by the I-Beam tool. Any region that is copied may be pasted anywhere in the document by using the **Paste** command.

Paste

The **Paste** command allows you to place any region that has been previously copied by either the **Cut** or **Copy** command. You must first define an insert point by using the I-Beam tool.

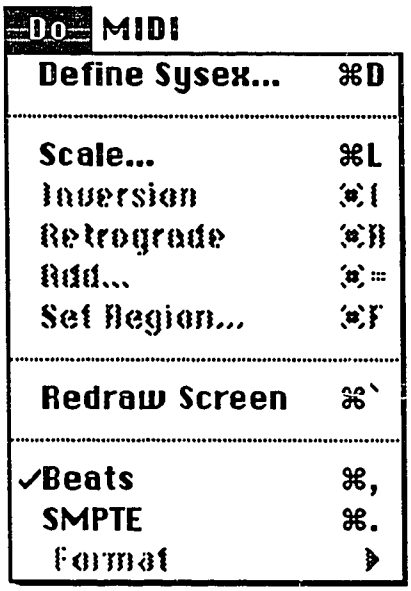
Clear

The **Clear** command will clear the entire Draw window unless a region has already been defined with the I-Beam tool. In that case, the **Clear** command will only clear the selected area.

Select All

The **Select All** command allows you to quickly select the entire area of the gesture. Choosing **Select All** will enable the **Retrograde**, **Inversion**, **Cut**, and **Copy** commands.

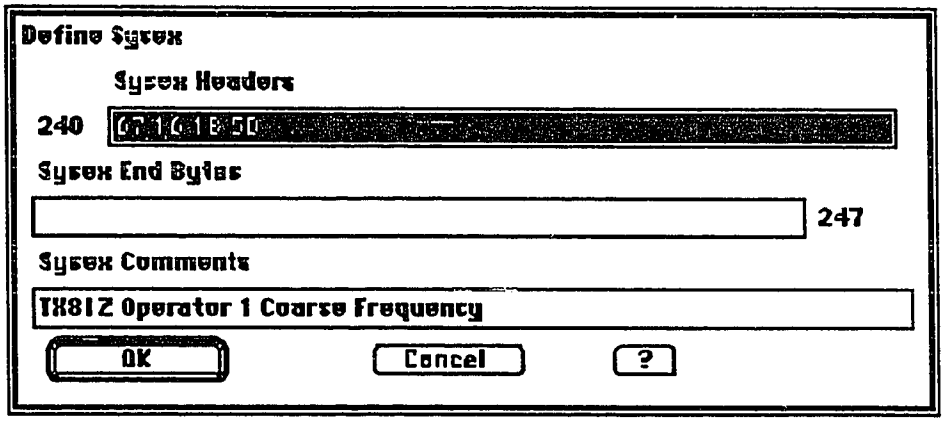
3.3 The Do Menu



The **Do** menu is the main menu of Jester. With this menu you can scale the duration of the entire System Exclusive gesture in bars, beats, clicks (default) or in hours, minutes, seconds and frames. You may also scale your gesture, define System Exclusive messages, invert, retrograde, add to your gesture and redraw the window. The bottom two choices, **Beats** and **SMPTE** allow you to change the current format of the time display at the bottom of the Draw window.

Define Sysex

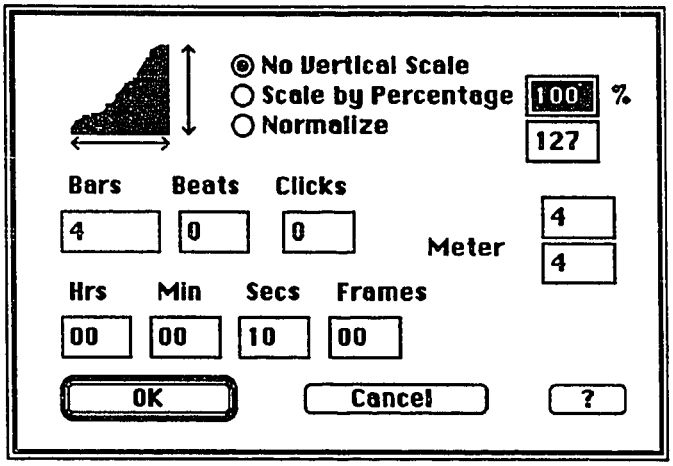
Define Sysex allows you to specify the System Exclusive event. This dialog allows you to control almost any device that can utilize real-time System Exclusive parameter changes.



Enter System Exclusive values into the text fields using the standard Macintosh operations. You may also enter an optional comment in the **Sysex Comments** field. This will be saved on a per file basis and will be automatically loaded with every file. Notice that the **Sysex End Bytes** field is left blank. This is because this specific example does not need any end bytes.

Scale

The **Scale** command allows you to scale your gesture vertically by percentage and horizontally in terms of bars, beats, clicks or by SMPTE time in Hours, Minutes, Seconds, and Frames. The time display located at the bottom of the Draw window will change to reflect the current time choice as indicated in the **Do** Menu. If **Beats** has been selected in the **Do** menu, then scaling will be based according to the beats, clicks, and meter settings. If **SMPTE** has been selected, scaling will be based on hours, minutes, seconds, and frames.



Inversion

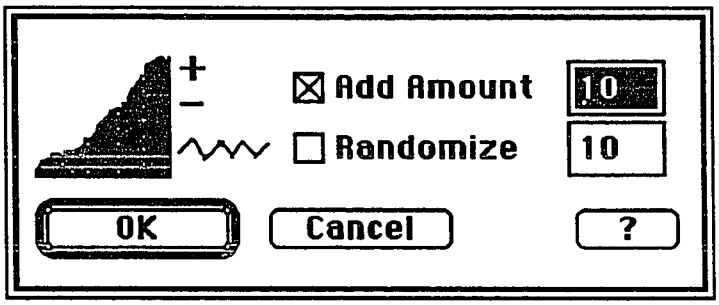
The **Inversion** command allows you to invert the specified area. This area must first be selected with the I-beam tool. In Jester, inversion is done by subtracting the current value from 127.

Retrograde

This command allows you to retrograde the specified area. This area must first be selected with the I-Beam tool. Jester performs a retrograde by swapping events in the selected region. The first event is exchanged with the last, the second is switched with the second to the last and repeated until all events have been exchanged.

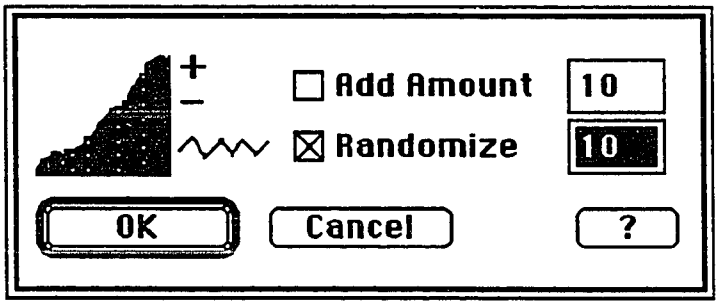
Add

This command allows you to add an amount to selected region. Valid numbers are from -127 to +127.



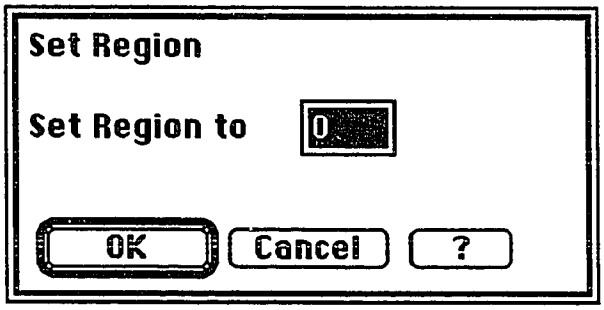
Randomize

This command randomizes the selected region by defining a randomized "window". The "window" is created by generating a new arbitrary value between 0 and the entered value. The new value is then divided by two and added or subtracted to each event in the selected region in a random fashion. For example: if the number 10 is entered, Jester will add or subtract 5 for every event on an arbitrary basis.



Set Region

The **Set Region** command allows you to set all values of a selected region to the specified value. This is useful if you would like to "fill" an area with a static value for a period of time. Choosing the **Set Region** command brings up the following dialog:



The **Set Region** value is initially set to 0. You may change this value at any time to fill a region with another value.

Redraw

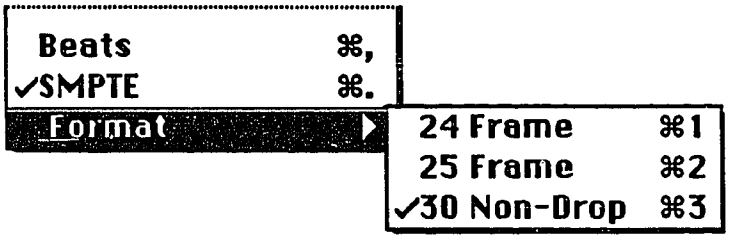
Redraw redisplays the current window. You may need to use this command if some parts of the window are not updated properly. This will usually happen if you are in MultiFinder and many windows are open over Jester's Draw Window.

Beats and SMPTE

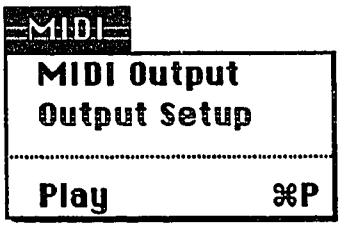
The last two menu commands, **Beats** and **SMPTE**, allow you to change the display format of the cursor position at the bottom of the Draw window. Choosing **Beats** will produce a display in beats and clicks. Choosing **SMPTE** will change the display to hours, minutes, seconds and frames.

Format

The **Format** command specifies the type of SMPTE values displayed. Three standard SMPTE formats **24 Frame, 25 Frame,** and **30 Non-Drop** frame can be chosen.



3.4 The MIDI Menu

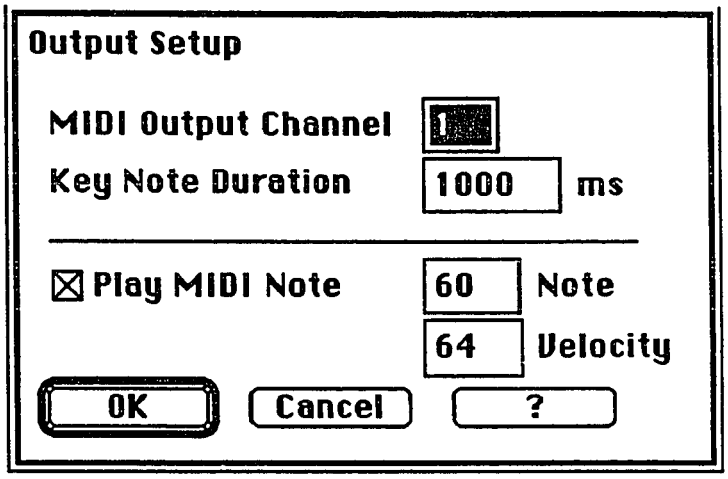


MIDI Output

The **MIDI** menu of Jester allows you to setup your MIDI parameters. The first command: **MIDI Output** is a toggle/check item. Choosing **MIDI Output** will reverse the current state of the item. For example: if **MIDI Output** is checked, selecting it from the MIDI menu will uncheck it. Choosing it again will check it again. When **MIDI Output** is checked, Jester will output System Exclusive events to the **MIDI Manager**™ in real-time as you enter them with the mouse.

Output Setup

The **Output Setup** menu choice brings up a dialog box that allows you to specify your MIDI output parameters. Several parameters can be defined in the **Output Setup** dialog: **MIDI Output Channel, Key Note Duration, Play MIDI Note, Note**, and **Velocity.. MIDI Output channel** will echo any notes played with the Macintosh keyboard out the specified MIDI channel. **Key Note Duration** will delay the note-off command the specified number of milliseconds since the first note-on. In order to play a MIDI note, you must press the the letter keys which are assigned to notes (See section 4.2). **Play MIDI Note** when checked will tell Jester to output the specified note and velocity to the **MIDI Manager**™ whenever **Play** is selected. The **Note** and **Velocity** entry fields define the attributes of the **Play MIDI Note.**



MIDI Output Setup dialog

Play

The **Play command** will send the gesture out to the **MIDI Manager™** as System Exclusive events. You must first patch Jester into the **MIDI Manager™** with the **MIDI Manager™ Patch Bay** program and toggle **MIDI Output** in the **MIDI** menu. The **Play** command once activated, will initially send a MIDI note out the **MIDI Manager™** if you have **Play MIDI Note** checked in the **Output Setup** dialog box. You may also play notes manually by pressing the Macintosh letter keys. The duration and MIDI channel for these "keyed notes" are also defined in **Output Setup.**

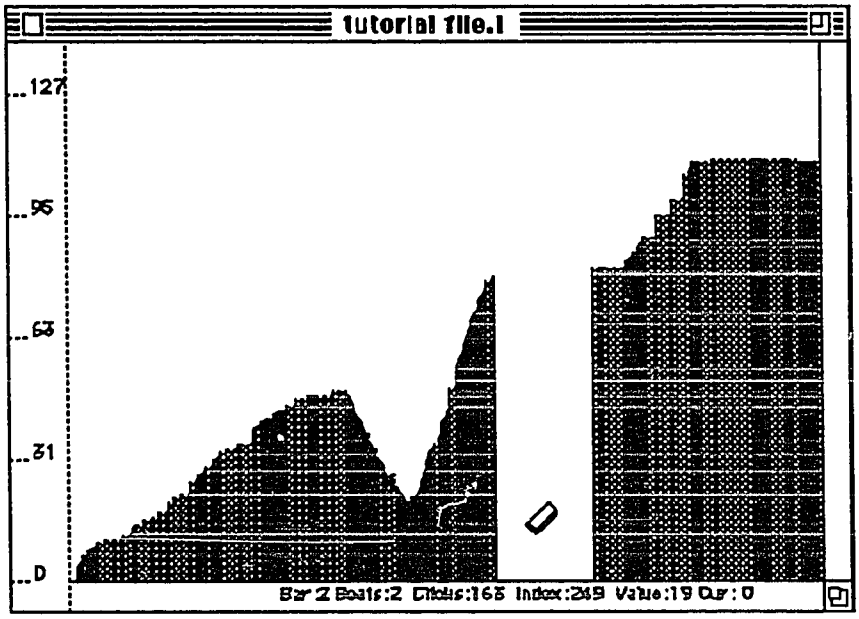
4 Advanced Tutorial

4.1 More Editing

This section explores some advanced editing capabilities such as using the Eraser tool and **Retrograde** and **Inversion** processing.

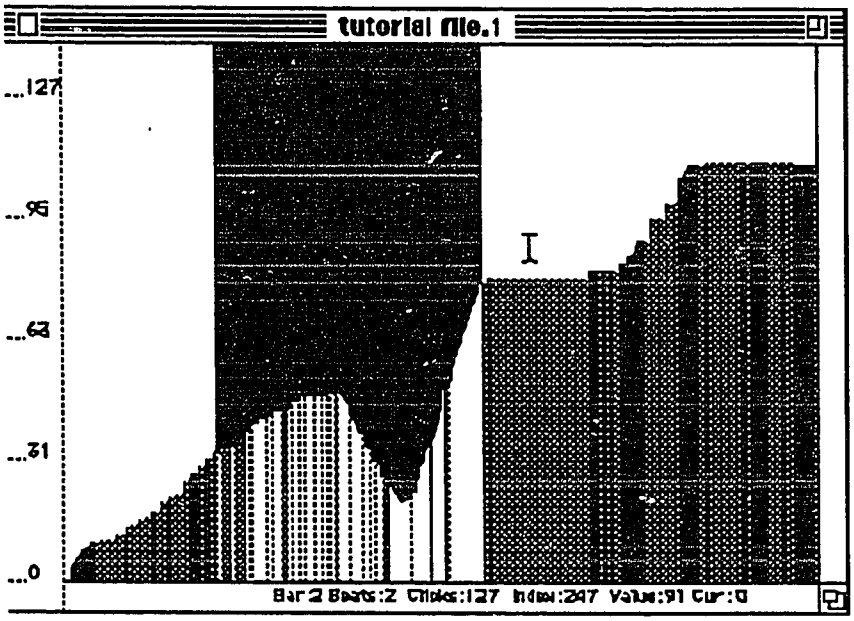
Eraser mode

To erase a part of the gesture, hold down the **option key** to turn the cursor into an eraser. Drag the mouse over an area of the gesture to make it look like figure 3. The eraser clears or erases events and inserts a 0 value into the erased area. Notice that the eraser enables you to selectively wipe out a very small region at a time.

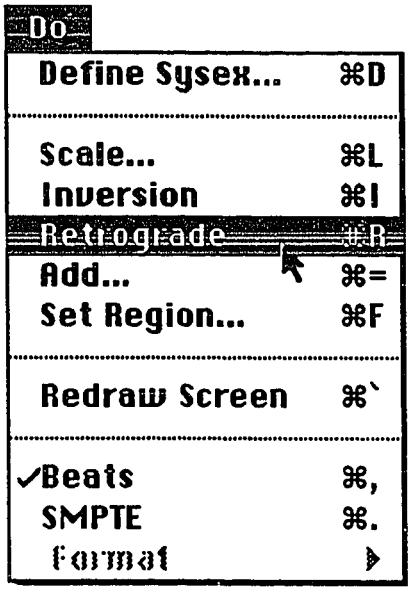


I-Beam Mode, Retrograde and Inversion

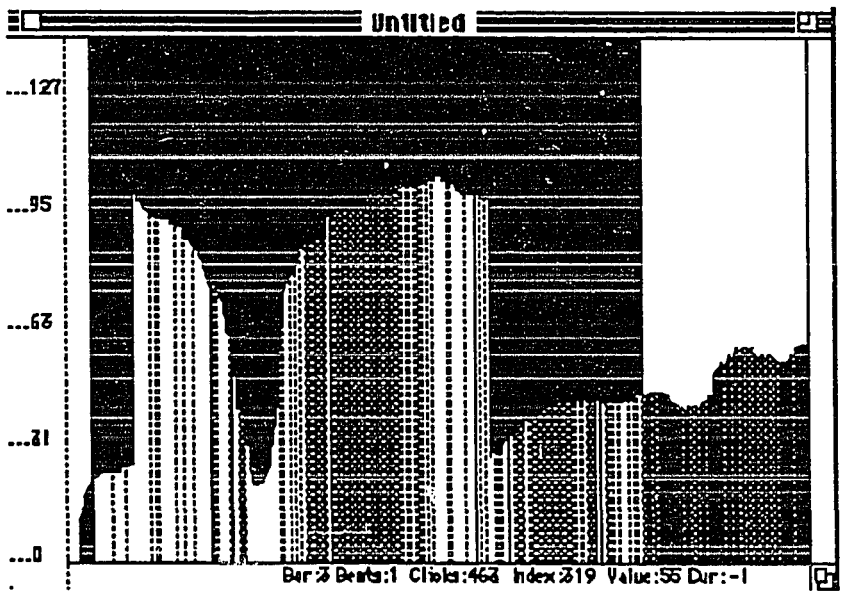
To select a very large area of the window, hold down the **shift key** to turn the cursor into an I-Beam. This tool is used to select large areas for any type of edit. While holding the **shift key** down click-drag over an area of the gesture. Notice that the color of the area becomes reversed or inverted, indicating that Jester is waiting for you to perform an operation. If you look into the **Do** menu, you will see that **Inversion** and **Retrograde** are now accessible.



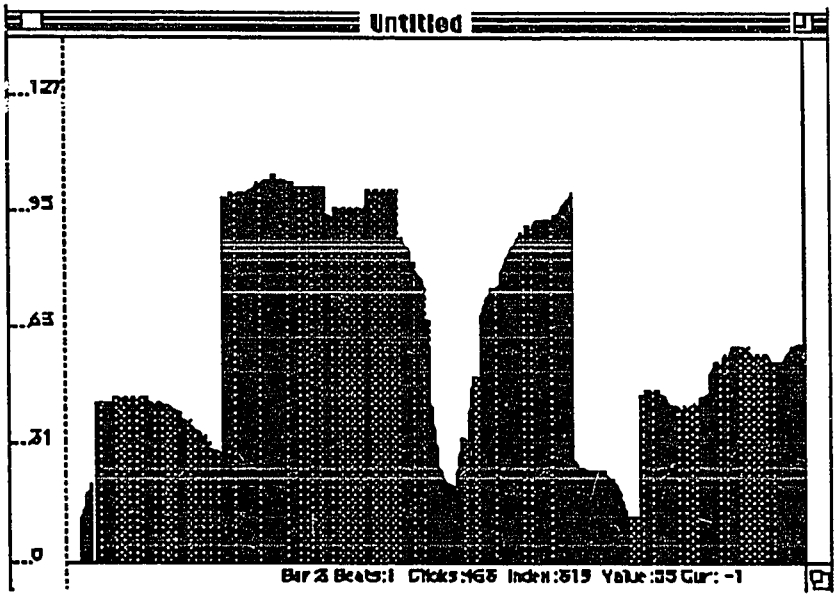
Area selected with **shift key** held down



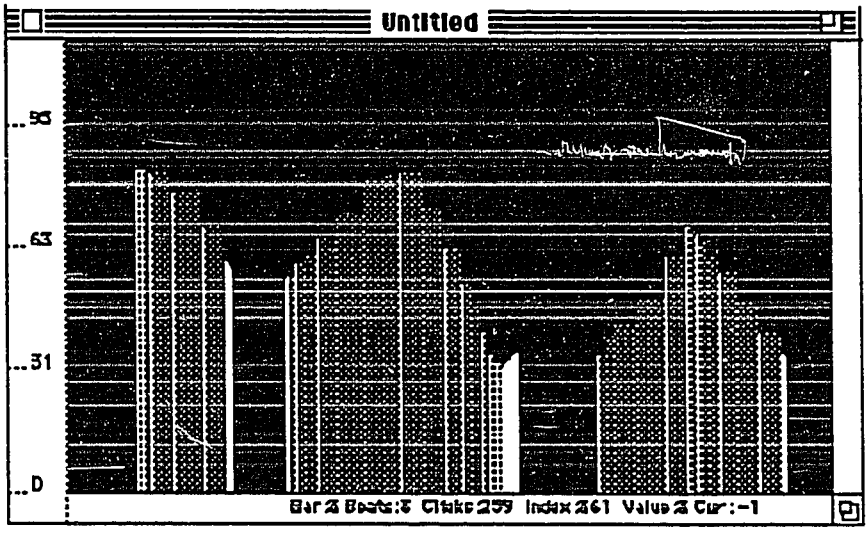
Study the figures that follow and then try selecting some areas and choosing **Retrograde** and **Inversion.**



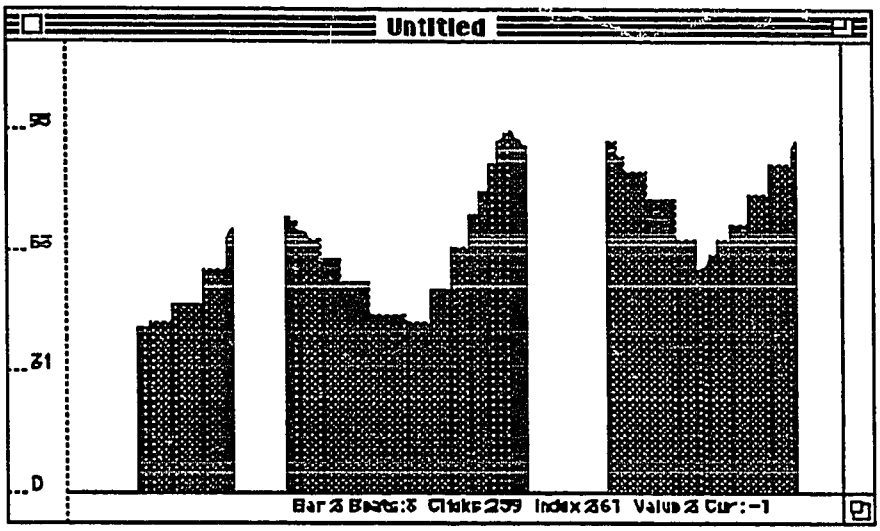
Area selected for **Retrograde**



Area after **Retrograde**



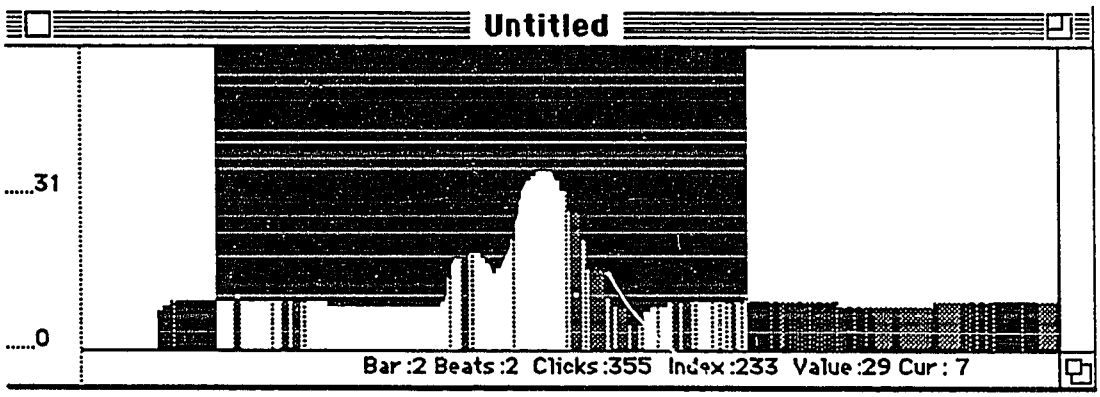
Area selected for **Inversion**



Area after **Inversion**

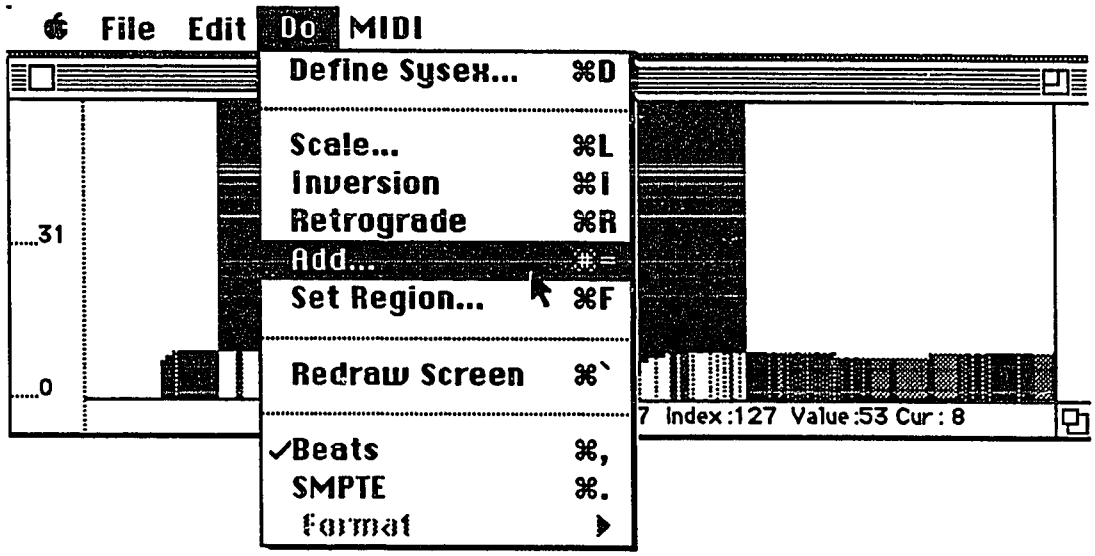
Adding and Randomizing

With Jester it is also possible to increase, decrease or randomize gesture values. The **Add** command allows you to access these functions. Before you can perform an **Add** or **Randomize** you must first select the area with the I-Beam tool.

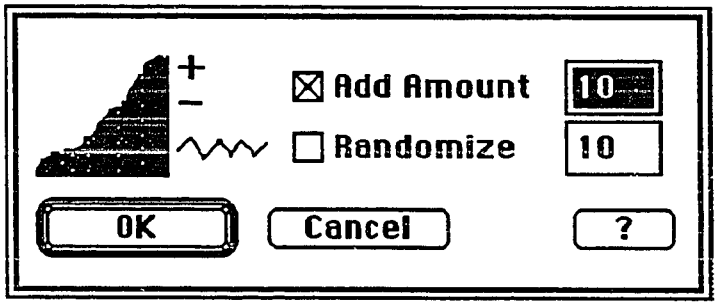


Area selected with I-Beam tool

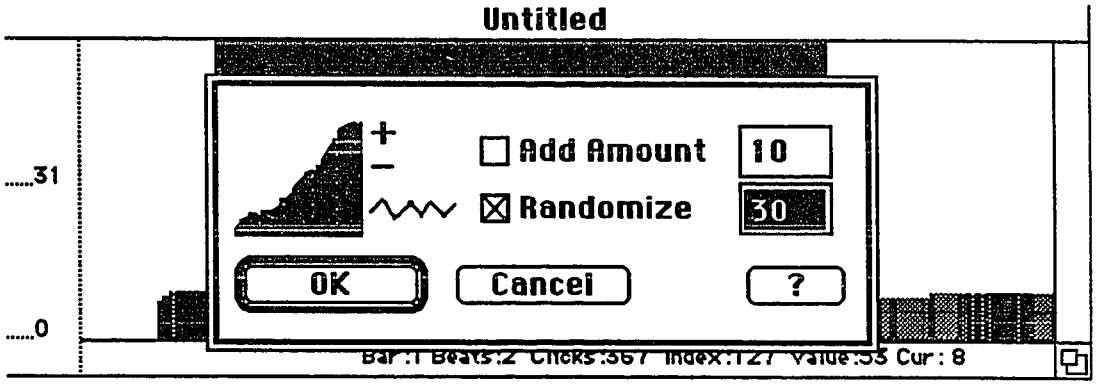
Next select **Add** from the **Do** menu.



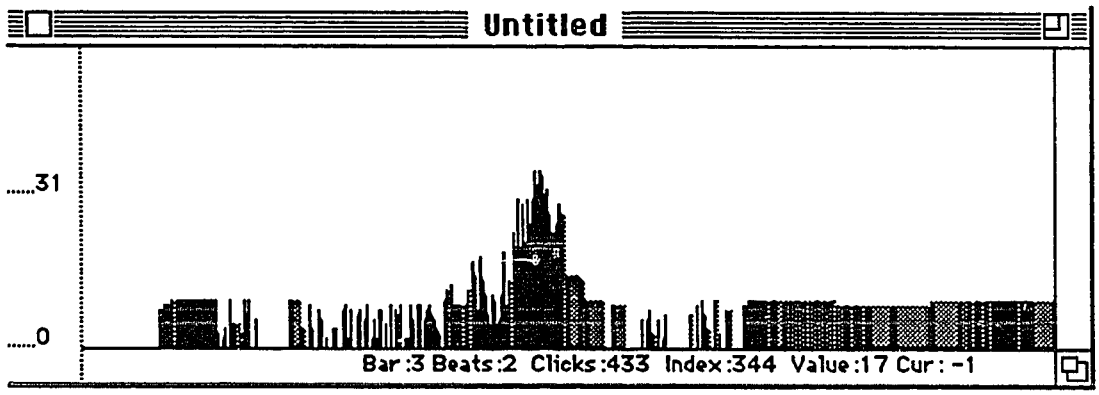
The following dialog will appear:



Checking the **Add Amount** command will add the specified value to the gesture. Values above 127 will be clipped to 127, values below 0 will be clipped at 0. You may also type in negative amounts for **Add Amount**. Checking the **Randomize** command will add ± (Value/2) to the current gesture. Therefore a value of 30 will add or subtract plus or minus 15 to the current gesture.



Randomizing selected area

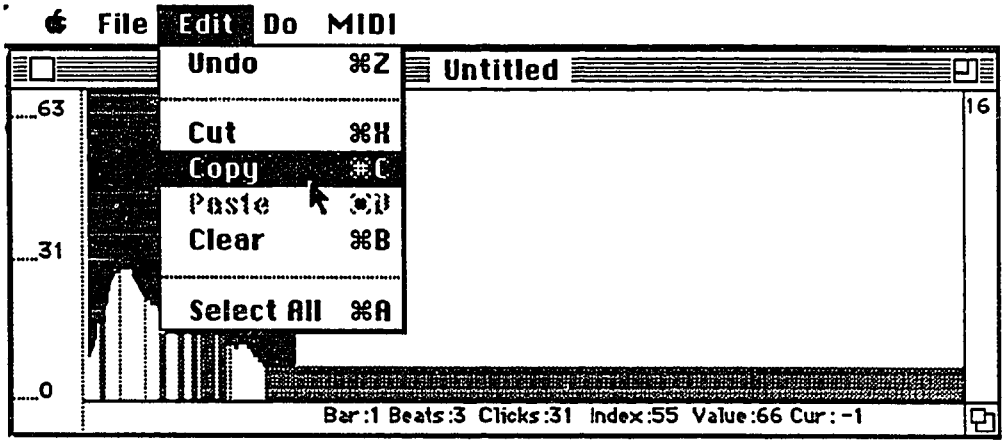


Area after Randomizing

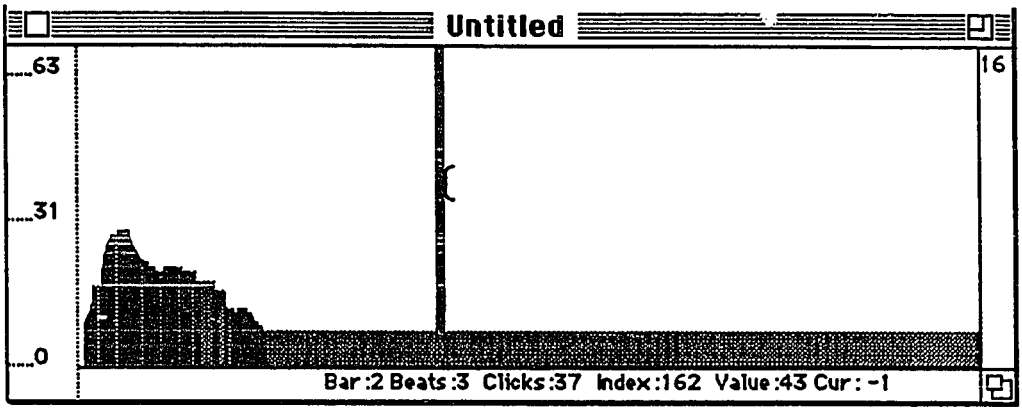
Type in some values and see the effects **Add Amount** and **Randomize** have.

Cut, Copy and Pasting

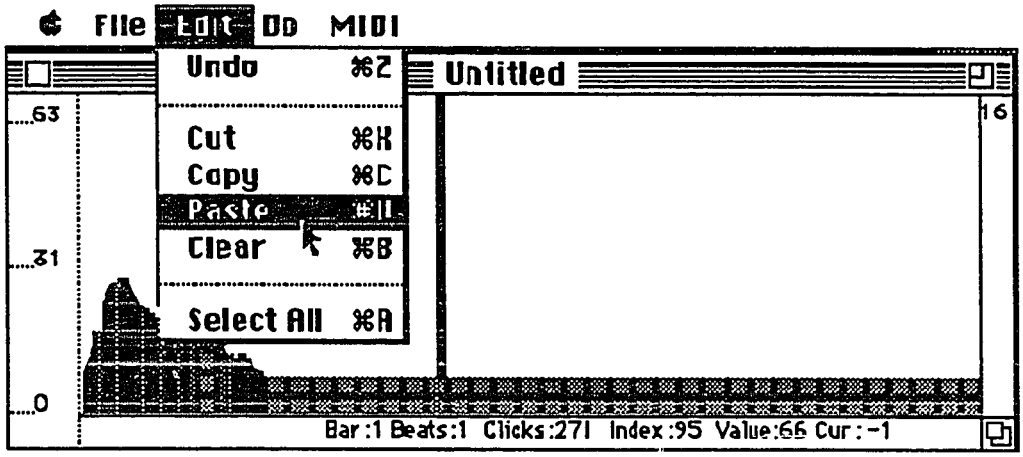
Jester supports cutting, copying and pasting of regions. Regions must be selected before they can be cut, copied or pasted. To select a region use the I-Beam tool, hold down the **shift key** and click-drag over any part of the gesture. The area will become inverted, indicating that it has been selected. At this point you may use the **Copy** or **Cut** function. **Copy** will place a copy of the selected region into a part of memory to be later used in a paste operation. Copying leaves the gesture intact. Cutting, on the other hand, "zeroes" out the region and places the old region into memory to be later used as a paste. Cutting is identical to erasing with the Eraser tool except you can't paste an erased region. To paste a region into a gesture you must first copy or cut a part of the gesture and define an insertion point. An insertion point is defined when you invert any part of the gesture using the I-Beam tool. Once a insertion point has been defined, you may use the **Paste** command in the **Edit** menu.



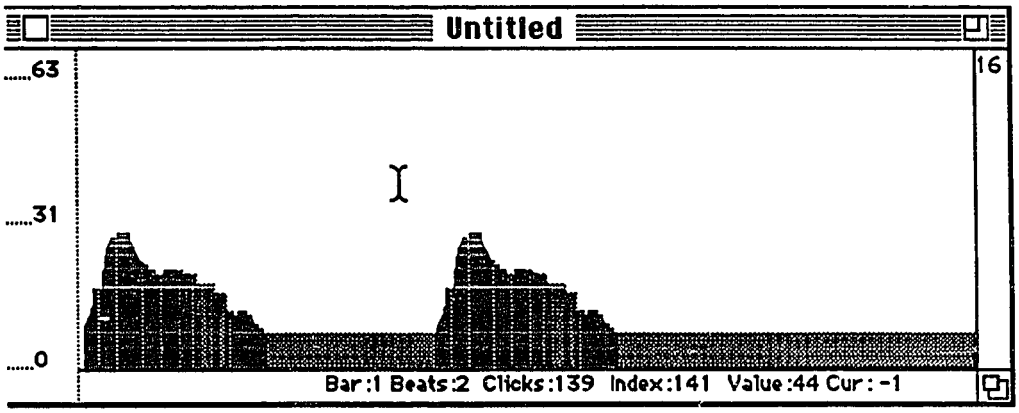
Select a region then choose the **Copy** command



Define a paste point with the I-Beam tool



Select **Paste** from the **Edit** menu

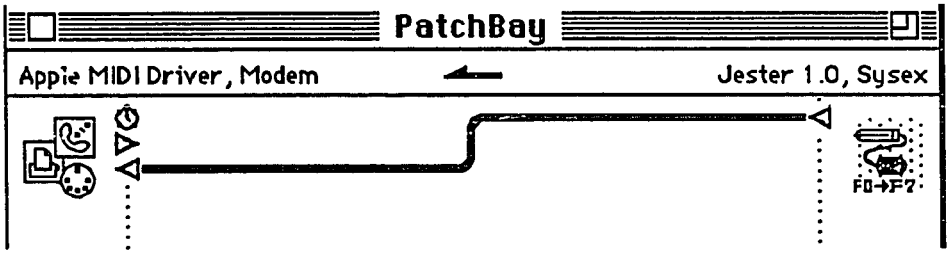


The completed paste

4.2 Playback

Using the MIDI Manager™

To control the synthesizer, select **MIDI Output** from the **MIDI** menu. This will output System Exclusive messages to the MIDI Manager™. Run the **MIDI Manager™ Patchbay D/A** or **PatchBay** Application and connect Jester's MIDI out port to the **Apple MIDI Driver** input port. You are now connected and can transmit to the synthesizer.



Connect Jester to the **MIDI Manager™** by using the **Patchbay**

Set up the synthesizer so that it is on channel 1 and memory protect is off. (see your manual on how to do this) Click-Drag on the Draw window and look at your synthesizer display. You should see a change in parameter values.

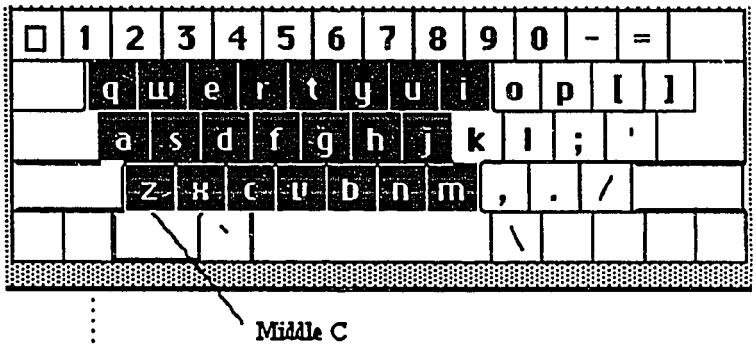
```
e1111 FREQ. OP1
CRS(RATIO)=10.00
```

A TX81Z Example.

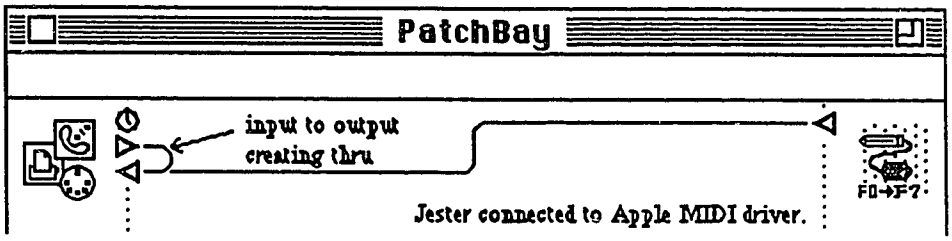
The parameter value will change when you click in different parts of the window. It will get larger as you click higher and smaller as you click lower on the Draw window.

Playing Your Gesture

To send a gesture to the synthesizer simply select **Play** from the **MIDI** menu or type **command-P** to start playback. Press the letter keys 'z'-'m','a'-'j', and 'q'-'i' to play notes on your MIDI device. The duration of the notes is governed by the number defined in the duration field of the **Output Setup** dialog box and is specified in milliseconds (see section 3.4). You may stop playback of your gesture any time by holding down the mouse button.



To play notes on your synthesizer using a MIDI controller, run the **PatchBay D/A** or application and connect the MIDI in on the **Apple MIDI Driver** to the MIDI out and play your own MIDI controller (read the **PatchBay** online help for instructions).



Connecting the MIDI in of the **PatchBay** to the MIDI out will essentially provide a simple software thru capability echoing any MIDI input to the output port.

4.3 Saving and Exporting the Gesture

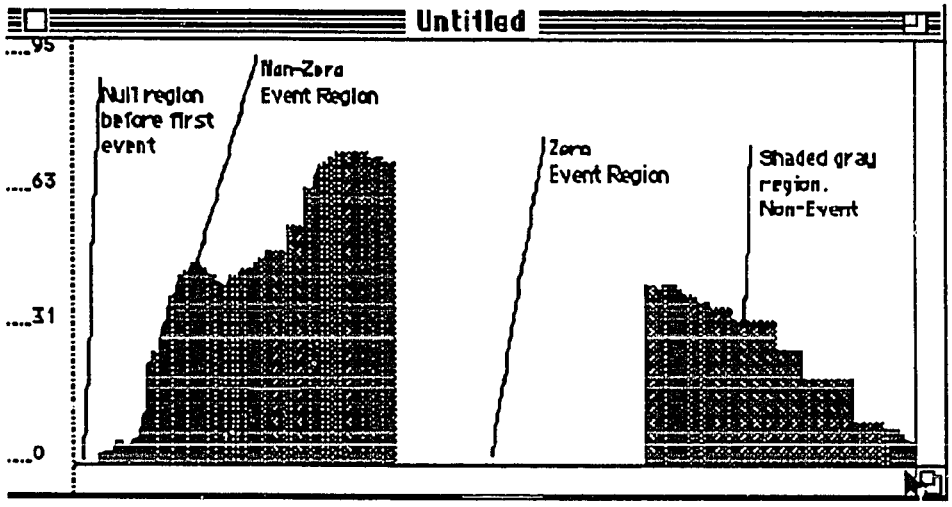
Save your gesture using the **Save** command as mentioned earlier.

Exporting as a Standard MIDI File

To export as a standard type 0 MIDI file, choose **Export MIDI File** from the file menu. Type in a suitable name and press return. You have now saved you gesture as a MIDI file. Any program that can read standard MIDI files and handle System Exclusive events can use your gesture. Sequencers that can handle System Exclusive data can **Import** the MIDI file and merge many different MIDI files together altering many parameters at once. Many sequencers also have time scaling and sophisticated displays allowing you to view controller and note data simultaneously along with your System Exclusive data.

About Regions

There are four types of regions in Jester's Draw window. The first type is a **Null Region** existing before the first event that you create with the pen tool. Null regions merely indicate the length of time before the first event region. There is no System Exclusive event generated at all in null regions. The second type is the **Non-Zero Event Region** indicated by dark black areas. This is the most common type of region. Simply click-dragging the pen tool in the Draw window creates Non-Zero event regions. Non-Zero event regions create non-zero System Exclusive events that are written to disk and are transmitted out the MIDI port. The third type of region, **Zero Event Regions**, indicated by white blank areas of the window, define an area where System Exclusive events of value zero are to be created. These zero System Exclusive events can only be created using the eraser tool or the cut or clear commands in the edit menu. Zero event regions are written to disk and transmitted out the MIDI port. The last type of region, the **Non-Event Region** is shaded gray indicating that the MIDI device is currently at a static value. Non-event regions are not written to disk or transmitted, thus saving memory and disk space. They are there to give you a visual indication of the current state of the MIDI device.

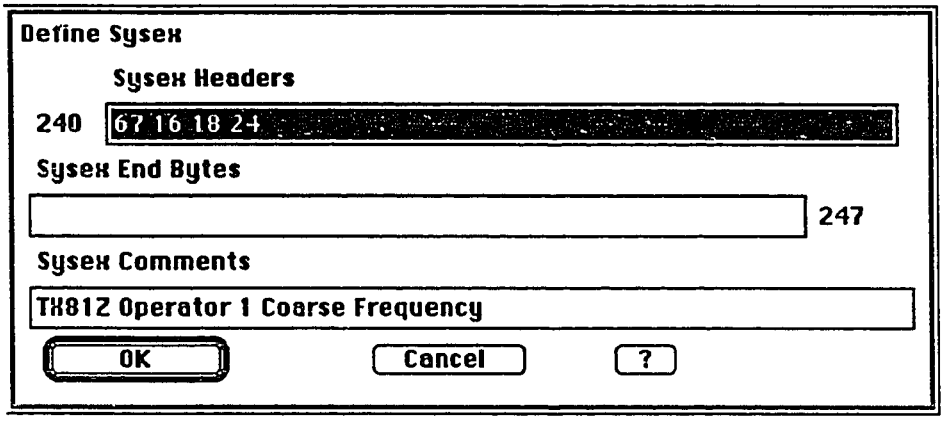


4.5 Advanced Applications

In the following examples you can use Jester to control different aspects of timbre, amplitude and modulation using the Yamaha TX81Z as a model. This example specifically uses the TX81Z ROM sound B03 Flugelhorn but the process can easily be to other instruments if you have the System Exclusive parameter list.

Jester as a Timbral Controller

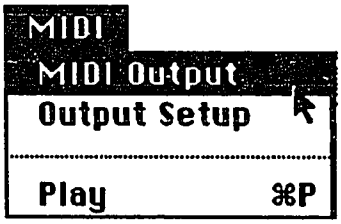
Choose **Define Sysex** from the **Do** menu and type in the following numbers in the **Sysex Headers** entry field: 67 16 18 24



Note that this is almost the same entry as the advanced tutorial section. The only number changed is 24. The previous number 50 was the parameter describing the coarse frequency of Operator 1. In this example you will access and alter parameter 24 Operator 2's coarse frequency. A quick review of the entry: 67 is the manufacturers ID for Yamaha instruments; 16 is the device ID where ID is defined as 16 plus the channel number. Channel is defined as the range 0-15 in this example, although this may be different for your particular situation. 18 is the group number indicating a part of the TX81Z's internal grouped memory and 24 is the parameter number that you will change. Select any voice on the TX81Z by pressing the PLAY/PERFORM button on the front panel until the LCD display indicates that you are in PLAY SINGLE MODE. Select ROM sound B03 by using the Parameter left and right buttons to select banks and the Data Entry DEC and INC buttons to select the individual sounds.

Play single mode with ROM sound B03 Flugelhorn selected.

Select **MIDI Output** from the **Do** menu. This will make Jester output your input gestures as System Exclusive events.

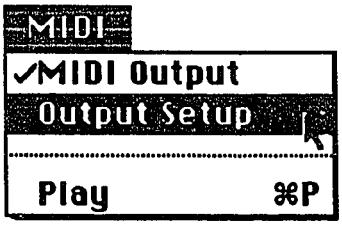


Select MIDI Output

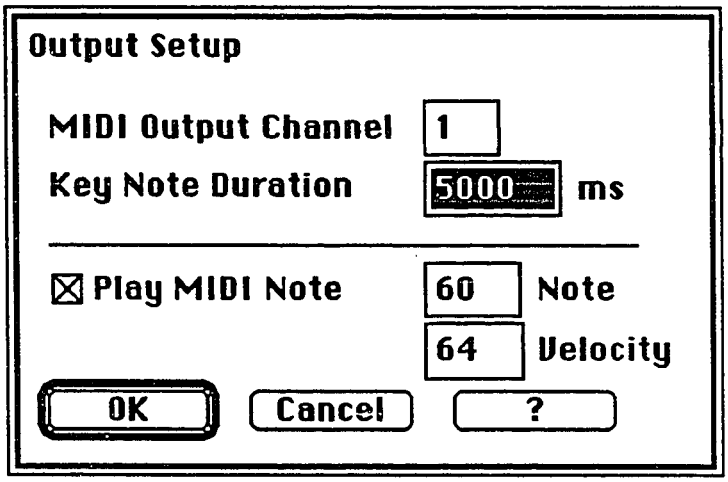
Drag anywhere in the Draw window. You will see the TX81Z indicate that you are accessing and changing Operator 2's coarse frequency.

Operator 2 coarse frequency.

Because Flugelhorn uses Algorithm 3 which has Operator 1 as a carrier and Operator 2 as a Modulator, changing the coarse frequency of Operator 2 results in timbral changes. Raising and lowering the frequency of Operator 2 causes shifts in the spectrum of Flugelhorn. Press the letter keys to hear the Flugelhorn sound and draw gestures in the Draw window to hear the different timbral changes. You may want to increase the duration of your played notes. To do this, select **Output Setup** from the **MIDI** menu and increase the duration to 5000. This sets the duration of any keyed notes to approximately 5 seconds.



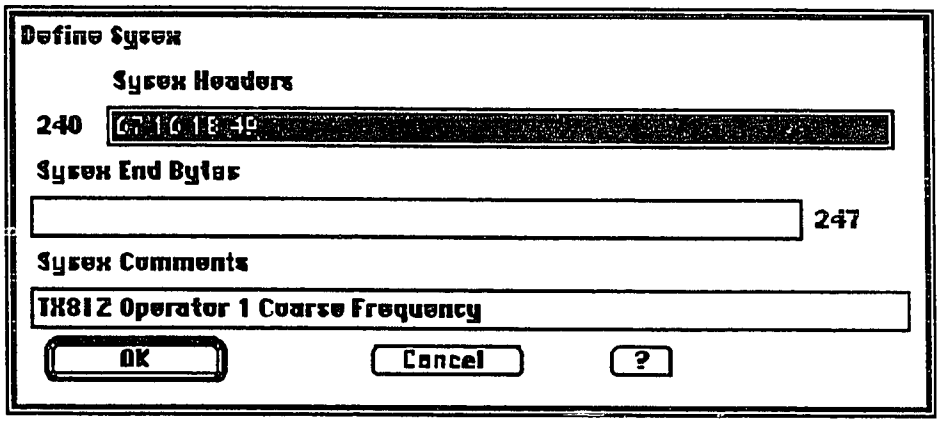
Select **Output Setup.**



Increase duration to 5000.

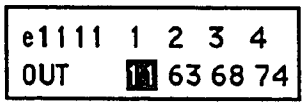
Jester as a Amplitude Controller

You will now use Jester to control the total level of Operator 1. This will essentially alter the amplitude of the Flugelhorn voice. Type in the following numbers in the **Define Sysex** dialog box: 67 16 18 49.



Defining Operator 1 Total Output Level

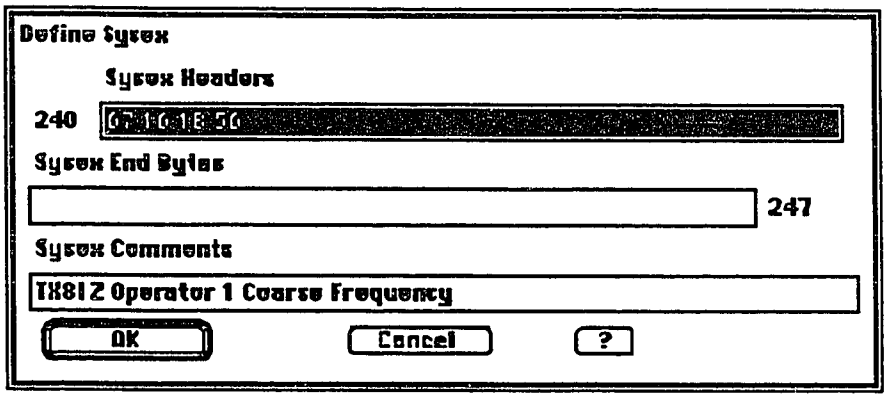
Because Operator 1 is a carrier, changing its Total Output level will result in a change in amplitude. Play some notes with the letter keys and draw new gestures in the Draw window. You will see the TX81Z respond with the following display indicating that you are altering the Total Output level of Operator 1.



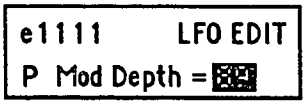
Altering the Total Output Level of Operator 1.

Jester as a Modulation Controller

Type in the following values in the **Define Sysex** Dialog box: 67 16 18 56.



Play some notes with the letter keys and draw events in the Draw window. The TX81Z will respond with the following display:



Altering the Pitch Modulation Depth.

You will hear the pitch modulation become greater as you draw events with larger values.

5 Summary

As you can see in these simple examples, Jester can be extremely versatile in controlling different aspects of a MIDI device. There can be hundreds of parameters that you can access and alter in a standard synthesizer patch. Try creating new files that can control other parameters of a synthesizer. Find new ways to make Jester control many other types of MIDI devices. Export as a MIDI File and let another program such as a sequencer manipulate your gesture by combining more than one parameter enabling you to control many parameters at once. Jester can be your tool to some new and unique sounds.

BIBLIOGRAPHY

Borenstein, P. *THINK's Lightspeed Pascal User's Manual.* Cupertino: Symantec Corporation, 1988.

Chernicoff, S.. *Macintosh Revealed Vols. 1 and 2.* Indianapolis: Hayen Books, 1987.

De Furia, S., and Scacciaferro, J. *The MIDI System Exclusive Book.* Los Angeles: Ferro Technologies, 1987.

Inside Macintosh Vols. 1-5. Menlo Park: Addison-Wesley Publising Company Inc., 1987.

International MIDI Association, *MIDI 1.0 Detailed Specification.* Los Angeles: International MIDI Association, 1988.

Knaster, S.. *Macintosh Programming Secrets.* Menlo Park: Addison-Wesley Publishing Company Inc., 1988.

Naiman, A.. *The Macintosh Bible.* Berkeley: Golstein and Blair, 1989.

Swan, T. *Programming with Macintosh Turbo Pascal.*, New York: John Wiley, 1987.

WT-11 Operation Manual., Japan: Yamaha Coporation, 1988

M

N

O

P

R

S

T

U

Z